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ABSTRACT

Sixty-seven educational research journals were investigated to determine the frequency of usage of inferential statistical techniques therein. The most frequently used statistical methodologies in the literature reviewed, which utilized inferential approaches, are the following: analysis of variance, correlation, t-test, multiple analysis of variance, multiple regression, chi square, post-hoc multiple comparisons, analysis of covariance, factor analysis, discriminant analysis, log-linear analysis, and path analysis. For the research instructor concerned about discussing the currently applied methodologies in educational research and statistics classes, these techniques merit consideration. While this list is certainly not definitive, the related literature supports a focus on at least the first few methods in the list. (Author)

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STATISTICAL METHODOLOGY CONTENT ANALYSIS OF SELECTED EDUCATIONAL RESEARCH JOURNALS

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ABSTRACT

A selection of sixty-seven educational research journals were investigated to determine the frequency of usage of inferential statistical techniques therein. The most frequently used statistical methodologies in the literature reviewed, which utilized inferential approaches, are the following techniques: analysis of variance (ANOVA), correlation, t-test, multiple analysis of variance (MANOVA), multiple regression, chi square, post-hoc multiple comparisons, analysis of covariance (ANCOVA), factor analysis, discriminant analysis, log-linear analysis, and path analysis. For the research instructor concerned about discussing the currently applied methodologies in educational research and statistics classes, these techniques merit consideration. While the list is certainly not definitive, the support of the related literature tends to encourage a focus on at least the first few methods in the list.

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STATISTICAL METHODOLOGY CONTENT ANALYSIS OF SELECTED EDUCATIONAL RESEARCH JOURNALS

Introduction

Numerous statistical methodologies have been developed for use as research tools in data analysis. So many approaches are available, in fact, that it has become virtually impossible to teach them all in a single statistics or research class. The lack of time for a comprehensive overview takes on even greater significance for the instructor of a research class for which there is no statistics prerequisite. The research instructor, then, must determine which statistical procedures are most appropriate for discussion in the small amount of time available for this purpose.

Assuming that an appropriate goal of a research course is to help develop research consumers, then it would seem reasonable to conclude that the students should become familiar with the statistical methodologies most frequently utilized in the relevant literature. Frequency counts have been employed by researchers for this purpose, among others, when analyzing professional journals and the articles appearing in them: Goodwin & Goodwin (1985), reviewed 449 articles published in the Journal of Educational Psychology for major statistical statistical techniques. Wallace (1985) examined 3465 articles in 99 journals from library and information science, social work, business, and education, to compare the use of statistical methods in these areas. Alpert & Yammer (1983)

analyzed school consultation articles in 165 issues of school psychology literature. Willson (1980) categorized the research and statistical techniques found in the American Educational Research Journal, according to discipline. Rabinowitz and Pruzek (1978) investigated factor analytical methods in eighty-nine studies in four educational and psychological journals.

In designing the study, a number of questions arose, including the number of journals to investigate, which journals, number of issues or years of each, and whether to choose consecutive years, a sample, or blocks of time. Appelbaum (1986) analyzed articles in Psychometrika over the period 1960-1984 and found 173 papers of a statistical nature. Ash and Love-Clark (1985) reviewed forty-eight educational psychology textbooks published from 1954 through 1983, randomly selected from those available in their campus library. Goodwin and Goodwin (1985) investigated the Journal of Educational Psychology over the five-year period 1979-1983. They drew a stratified random sample of 150 of the 449 articles published during that period. Wallace (1985) examined statistical use in each article in each 1981 issue of ninety-nine journals listed in the Journal Citation Reports section of the Social Sciences Citation Index. Alpert and Yammer (1983) analyzed 132 research articles in four research journals over a twelve-year period between 1970 and mid-1982 to determine the occurrence of research in school consultation. West, Carmody, & Stallings, (1983) analyzed empirical research articles in the Journal of Educational Research in 1970 and 1980 to determine if there were any qualitative differences. Gaziano (1982) reviewed fifty-eight studies

related to knowledge gap without regard to publication dates. West and Robinson (1980) randomly selected seventy-eight empirical research articles from the American Educational Research Journal, The Journal of Educational Psychology, and the Journal of Educational Research from as early as 1910, through 1974.

Rabinowitz and Pruzek (1978) reviewed eighty-nine studies in the same four journals as Glass and Taylor (1966) for the years 1975-1976. Glass and Taylor studied papers in the American Educational Research Journal (1965-March, 1966), the Journal of Educational Measurement (1964-1965), the Journal of Educational Psychology (1963-April, 1966), and Educational and Psychological Measurement (1963-Spring, 1966). Edgington (1974) tabulated the inferential statistical procedures used in seven American Psychological Association journals published between 1948 to 1972.

The Problem

The problem of this study was to conduct a frequency count of the inferential statistical techniques used in selected recent educational research journals.

Methodology

Journals were selected based on their availability in the University of Central Arkansas Torreyson Library, similar to the approach of using the

Sterling Evans Library on the Texas A & M University campus taken by Ash and Love-Clark (1985). Basic measures of central tendency, including means and standard deviations, were excluded following the approach of West, Carmody, & Stallings (1983). Editorials, letters to the editor, news items, book lists, bibliographies, and book reviews were also excluded, similar to the approach of Wallace (1985).

The journals which formed the database for the study were chosen from a list of research-oriented educational publications listed in a research text, Research in Education (Best & Kahn, 1986, p. 367-8). The journals actually investigated were limited to those publications to which the library subscribed which were not in the process of being bound and which were published between September, 1987, and March, 1988. January/February issues were chosen rather than March/April issues when the choice arose. Otherwise, the latest available issue was chosen.

Of the 143 journals listed, Torreyson Library held subscriptions to sixty-eight, of which one journal, Pollution Abstracts, was considered inappropriate for the study because it is comprised of abstracts rather than complete articles. The first empirical research article in the issue of each journal selected for inclusion in the study was perused for the type of statistical methodology or methodologies utilized. Each technique was counted only one time per article even if it appeared more than once. A list of the sixty-seven journals comprising the database appears in the appendix.

Findings

The frequency of occurrence of each statistical technique is recorded in tabular form on page 6. The results are similar to the findings of related studies (Appelbaum, 1986; Goodwin & Goodwin, 1985; West, Carmody, & Stallings, 1983) in that the analysis of variance (ANOVA and MANOVA), correlational, t-test, multiple regression, and chi square procedures are among the most frequently utilized statistical methods.

The statistical techniques listed include variations. For example, ANOVA includes both one- and two-way analyses. Correlation includes Pearson's "r" and Kendall's tau. The t-test includes directional and nondirectional approaches. The other techniques are similarly representative of the methods listed and the techniques closely related to them.

Limitations

The selection of journals is open to some question since not all educational research publications were available for consideration. However, the wide selection of journals which were available seems on face value to be reasonably representative. Reviewing all of the articles in each of the sixty-seven journal issues selected might have provided a more representative sample.

Table 1

Statistical Techniques by Frequency and Percentages

Statistical Technique	Frequency	% of 67 Journals Sampled	% of 34 Inferential Journals
ANOVA	15	22%	44%
Correlation	7	10%	21%
t-test	7	10%	21%
MANOVA	6	9%	18%
Multiple Regression	6	9%	18%
Chi Square	5	7%	15%
Post-Hoc Comparisons	5	7%	15%
ANCOVA	4	6%	12%
Factor Analysis	4	6%	12%
Discriminant Analysis	3	4%	9%
Log-linear Analysis	2	3%	6%
Path Analysis	2	3%	6%
Other	2	3%	6%
None	4	6%	12%

Conclusions

From the results of this study, it appears that among the dozen most frequently used statistical methodologies in the educational research literature which utilized inferential approaches are the following techniques: analysis of variance (ANOVA), correlation, t-test, multiple analysis of variance (MANOVA), multiple regression, chi square, post-hoc multiple comparisons, analysis of covariance (ANCOVA), factor analysis, discriminant analysis, log-linear analysis, and path analysis. For the research instructor concerned about discussing the currently applied methodologies in educational research and statistics classes, these techniques merit consideration. While the list is certainly not definitive, the support of the related literature tends to encourage a focus on at least the first few methods in the list.

References

Alpert, J. L., & Yammer, M. D. (1983). Research in school consultation: A content analysis of selected journals. Professional Psychology Research and Practice, 14(5), 604-612. (From Psychological Abstracts, 1984, 71, (Abstract No. 16077).

Appelbaum, M. I. (1986). Statistics, data analysis and psychometrika: Major developments. Psychometrika, 51(1), 53-56. (From Psychological Abstracts, 1986, 73, Abstract No. 18905).

Ash, M. J., & Love-Clark, P. (1985). An historical analysis of the content of educational psychology textbooks 1954-1983. Educational Psychologist, 20(1), 47-55. (From Psychological Abstracts, 1985, 73, Abstract No. 04831).

Best, J. W. & Kahn, J. V. (1986). Research in education (5th ed.). Englewood Cliffs, NJ: Prentice-Hall.

Edgington, E. S. (1974). A new tabulation of statistical procedures used in APA journals. American Psychologist, 20, 5-12, cited in Goodwin & Goodwin, op. cit.

Gaziano, C. (1982, July). The knowledge gap: An analytical review of media effects. Paper presented at the annual meeting of the Association for Education in Journalism, Athens, OH.

Glass, G., & Taylor, P. (1966). Factor analytic methodology. Review of Educational Research, 36, 566-587. In S. Rabinowitz & R. Pruzek, op. cit.

Goodwin, L. D., & Goodwin, W. L. (1985). An analysis of statistical techniques used in the Journal of Educational Psychology, 1979-1983.

Educational Psychologist, 20(1), 13-21. (From Psychological Abstracts, 1986, 73, Abstract No. 04807).

Rabinowitz, S. N., & Pruzek, R. (1978, October). A modern perspective on some common factor methods: Reinstatement and rehabilitation of old methods for new purposes. Paper presented at the annual meeting of the Northeastern Educational Research Association, Ellenville, NY.

Wallace, D. P. (1985). The use of statistical methods in library and information science. Journal of the American Society for Information Science, 36(6), 402-410. (ERIC Document Reproduction Service No. EJ 330 134).

West, C. K., Carmody, C., & Stallings, W. M. (1983). The quality of research articles in the Journal of Educational Research, 1970 and 1980. Journal of Educational Research, 77(2), 70-76.

West, C. K., Robinson, D. G. (1980). Prestigious psycho-educational research published from 1910 to 1974: Types of explanations, focus, authorship, and other concerns. Journal of Educational Research, 73(5), 271-275.

Willson, V. L. (1980). Research techniques in AERJ articles: 1969-1978. Educational Researcher, 9(6), 5-10, cited in Goodwin & Goodwin, op. cit.

Appendix

Journals Investigated for Statistical Techniques

Administrative Science Quarterly
Adolescence
Adult Education Quarterly
American Behavioral Scientist
American Biology Teacher
American Educational Research Journal
Arithmetic Teacher
Black Scholar
Business Education Forum
Child and Youth Care Quarterly
Child Development
Child Study Journal
Childhood Education
Clearing House
Community, Technical, and Junior College Journal
Comparative Education
Comparative Education Review
Educational Administration Quarterly
Educational Forum
Educational Leadership
Educational Researcher
Educational Research Quarterly
Educational Technology
Elementary School Journal
Harvard Educational Review
High School Journal
History of Education Quarterly
Home Economics Research Journal
International Journal of Aging and Human Development
Journal for Research in Mathematics Education
Journal for the Scientific Study of Religion
Journal of Communication
Journal of Creative Behavior
Journal of Drug Education
Journal of Educational Research
Journal of Experimental Education
Journal of Higher Education
Journal of Home Economics
Journal of Law and Education
Journal of Leisure Research
Journal of Negro Education
Journal of Religion
Journal of Research and Development in Education
Journal of Research in Music Education
Journal of Research in Science Teaching
Kappa Delta Pi Record
Library Resources and Technical Services
Mathematics Teacher

Merrill Palmer Quarterly
Modern Language Journal
North Central Association Quarterly
Outlook
Peabody Journal of Education
Phi Delta Kappan
Phylon
Public Opinion Quarterly
Research in Higher Education
Research in the Teaching of English
Review of Educational Research
School Science and Mathematics
Science
Science Education
Science Teacher
Social Education
Teachers College Record
Theory into Practice
Young Children